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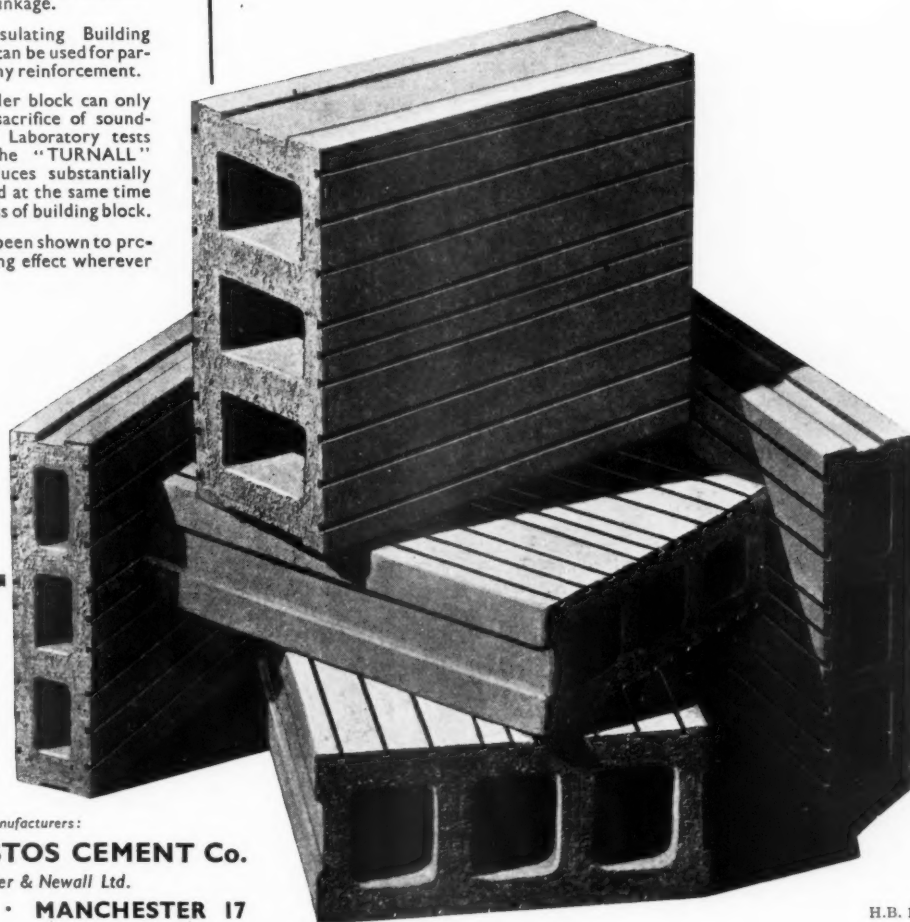
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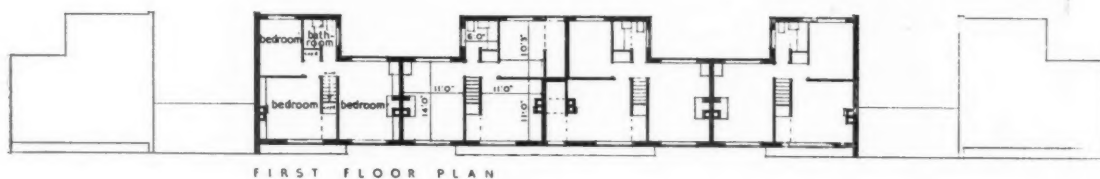
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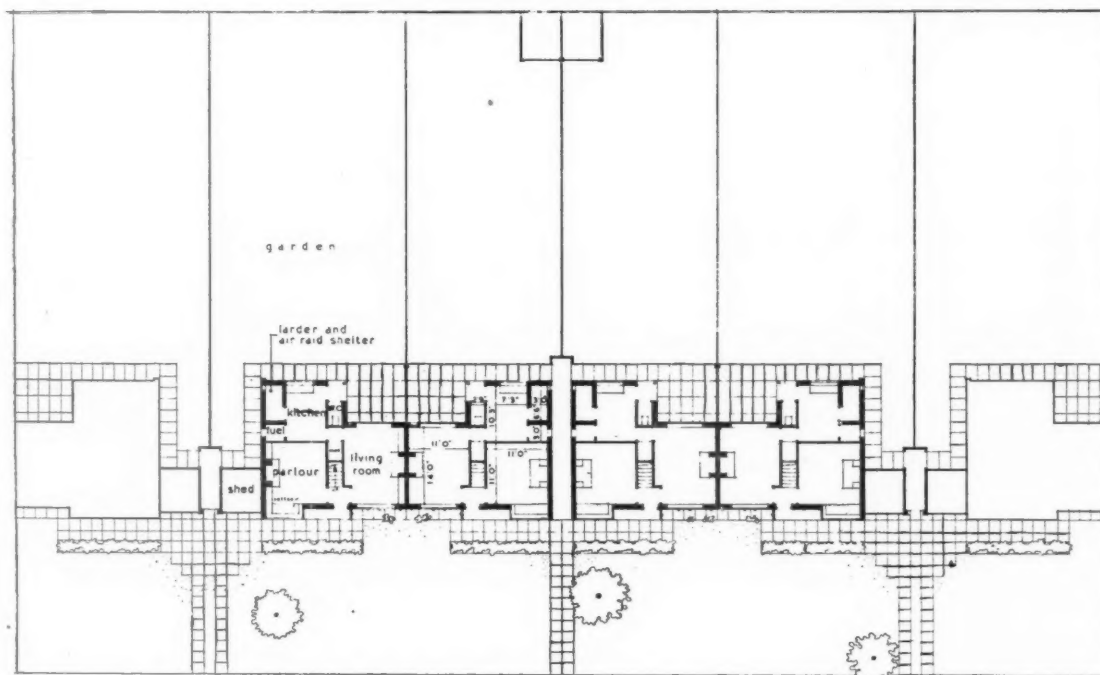
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HOUSING SCHEME, COVENTRY



FIRST FLOOR PLAN



GROUND FLOOR PLAN

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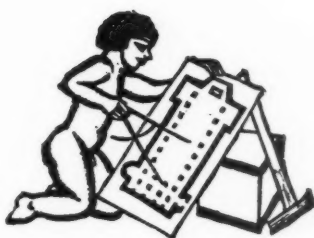
On page 41 of last week's issue we published illustrations of a housing scheme at Coventry, which is now being carried out from the designs of Mr. D. E. E. Gibson, the City Architect. We are informed by Mr. Gibson that the plans

published are not the ones being used for the houses, and we therefore show on this page another perspective and the correct plans. Details of the scheme are printed on page 68.



A N K A R A

*The entrance to the National
Museum in Ankara.*



PREPARATION FOR ACTION

A WEEK ago there appeared in the sixpenny Pelican series a book called *Town Planning** by Thomas Sharp. On first thought, this month may seem an odd time to publish a book on planning for the ordinary man. But the JOURNAL believes that the publication of *Town Planning* may prove the most outstanding example of Penguin Books' flair for producing a book on the right subject, written in the right way, by the right man, at the best possible moment.

This contention will bear amplification. Britain now faces the possibility of invasion and the certainty of a long and hard war. For the first time, the intimate surroundings of the ordinary citizen are in jeopardy: his house, suburb and town. And because these things are in imminent danger, the ordinary man realizes far more intensely than before their value to him, and that of the social institutions and groupings based on them. In the past month it has been the extraordinary and not the ordinary man who failed to see his surroundings with a new clarity, and to realize, as never before, the interdependence of the community to which he belonged. This last month has made the ordinary man alert. The blinkers of laziness and habit and *laissez faire* are gone.

It is sad that this new mood has arisen when almost all forms of constructive action have, necessarily, come to a stop. And when, so greatly does their post-war nature and scale depend upon the war's outcome that—in all fields save one—it is difficult to make worth-while preparations for their resumption. But the exception is the utmost consequence: it is town planning.

Other forms of post-war constructive action may depend on contemporary political or financial circumstances. Town planning does not. The war may obliterate physical or other impediments to positive planning: it will not, cannot, alter the post-war need for it, and cannot invalidate present knowledge of what it should aim at and the means by which those aims can be accomplished.

There is only one barrier to the post-war realization of effective town planning—the ordinary man has no knowledge of what it can do for him. No one has ever tried to tell him. The time to tell him is while this war lasts, while he sees his surroundings and his relationship with them with a new clearness, while he is eager—if only for a small part of his wartime day—to be able to think quietly about something that is permanently constructive.

* *Town Planning*, by Thomas Sharp. With 39 Illustrations. Pelican Series. Penguin Books. Price 6d.

Town Planning appears at this right time, and its contents could not be better for their purpose. From the first page, Mr. Sharp smashes the common idea of town planning as a dreary wilderness of legal definitions and schedules of road widths, and he also smashes some common ideas about town and country. He attacks fallacies that became accepted in the nineteenth century: that the British never made good towns or cared for towns; that towns are bound to be ugly—that muck means money; that the countryside is "natural" and therefore good and beautiful, while towns are artificial and therefore bad. To the fallacy of this third—almost religious—belief he gives the attention it deserves: for if any planning policy is to succeed the townsman must understand that the mass of the countryside is the scene of the farming industry, that its appearance has been made by farmers for farming and can be as easily ruined as any other industrial site.

In the remainder of his book Mr. Sharp considers town, country and planning under three main heads: the town for living; the country for townsmen's leisure; and the country for the countryman.

His central figure—necessarily—is the townsman, and his main aim to indicate how the townsman's needs can be fully supplied without what is now regarded as the inevitable spoliation of the countryside. He begins with those needs, and shows that the chief evil of the building development of 1919-39 was not that it ruined large areas of country but that in doing so it failed to supply the townsman's needs. The suburbs barred the exits to towns but developed no independent life of their own—they became simply dormitories, halfway between work and pleasure in the towns and leisure in the country. Their inhabitants gained a patch of ground and a little more air at the cost of much time and money, and lost the communal interests, pursuits and pride which are the best characteristics of urban life.

It is on the townsman's realization of this loss and appreciation of what a town could be that Mr. Sharp believes constructive planning primarily depends. In his view the Renaissance of the Town is the prerequisite of constructive town planning.

And in his last chapter Mr. Sharp reminds the ordinary man that a decision must be taken, one way or the other. It is planned building or planless building: but building there will be.

Houses, factories, roads and the rest of the utilities and services which go to make up the primary utilities of town and country, all have to be undertaken in any case. The work has to be done. We have the simple choice of doing it well or badly.



The Architects' Journal

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NOTES & TOPICS

SECOND BLACKOUT SEASON

ONLY those who are very tired or live in the very far north can now continue a nightly discussion whether to do the blackout or go to bed. The boring business has to be done: what is worse, it will have to be done earlier and earlier from now on.

I have three excuses for raising a depressing subject here and at this moment. Lighting offences are now being very sharply dealt with. The blackout devices of most houses are showing signs of wear and tear after their first war campaign, and this is the time for repairs or changes which will last out the war. Thirdly, architects between them must have tried out every imaginable domestic blackout device and should be able to give an expert ruling on the most fool-proof, easy and durable methods. It is therefore in the hope of information and correction from expert correspondents that I put forward my own conclusions. These are:

For large openings double curtains are the best solution. But if the blackout curtains are to be drawn easily and efficiently by an uninterested person, they are expensive to instal. They require a pelmet at the top and some form of cover strip at the side to which the outer edges of the blackout material are firmly attached. Once fitted, however, they can be drawn in a moment and are almost—I measure my words—fool-proof.

For smaller wood-framed window openings the blackout frame of laths covered with cloth seems the best alternative. It is simple and cheap to make, and easy to fix with home-made turn buttons. For openings up to 5 ft. by 4 ft., a blackout frame can be made for one-third of the cost and labour of fitting efficient curtains.

But the lath frame system is by no means roses all the way. On this point I write with authority.

The frames are fragile and have to be stored and handled. Lifting a frame from a rack of four or five, walking thirty feet and slipping it into position, seem simple operations: I find them so myself. Others do not. The sharp crack which follows the successful fitting by an uninterested person of the Bathroom frame (clearly labelled) into the Passage recess is a peculiarly distressing sound. Laths have a pronounced tendency to split and so are difficult to mend.

One architect at least, therefore, would be glad to hear of well-proved blackouts which avoid both laths and the rawlplugs, runways, pelmets and coverslips of full-figure curtain systems.

VICTORIAN PRECEDENT

Curtains 1940 were still in my mind when I paid a Sunday visit to a relative whose house has remained unchanged by any event, fashion or invention since about 1900.

Between furnishings of the kind Mr. Lancaster has drawn so carefully, I found myself at length studying the curtains of the shallow bay window: roller blinds with lace frills to each glazed section, looped lace curtains to each window, and huge plush curtains with fat tasselled girdles and fatter rings over the entrance to the bay.

And I thought how large a part have curtains and blinds in one's early memories of houses. Venetian blinds, roller blinds, strange concertina blinds, half drawn blinds, ticking and clattering blinds, rattling and swaying curtains—the pre-1914 house seems in memory to have been draped with them.

Why were they there? Partly, one supposes, from unthinking custom, but mostly because a ray of sunlight was still thought to spell death for furniture and fabrics even if it was no longer obligatory for Beauty to spend her days in darkened rooms.

It took us about thirty years to clean the windows, let the sunlight in and teach fabrics to rough it healthily. And even now the late Victorians have a shot left in their locker.

"Oh, for the blacking out here, my dear," said my relative, gently, "Wilson draws the big curtains for me. They are quite enough."

SUGGESTIONS FOR RESEARCH

One of the difficulties about rare events is that they tend so to fix themselves in the memory that they almost seem to be always happening. (Thus, for instance, doubts arise about the statistical propriety of the occurrence of coincidences.)

For this reason some factor of discount should perhaps be applied to an impression of mine, that the financially lower orders of society have more than their share of lively relationship with their visual surroundings. But I do seem to have met more instances of agreeable feeling for form among the women who come to do a couple of hours' rough work than among the more aspiring orders. Compare the furniture and crockery of a cabman's shelter with those of any type of teashop for the middling classes.

Perhaps the capacity among the old aristocracy for

culture, for taste, in fact for a living relation with matter (more often and more fundamentally than with thought), was, as much as to "leisure," due to their comparatively settled position in the world of people. If there is any truth in this, a hopeful moral can be drawn for the future. In the meantime, the research programme of the R.I.B.A. might include the investigation of the prerequisites of a cultural *levée en masse* (and of possible alternatives to the word cultural).

CAUTIOUS HOME-FINDING

During the peace of a country week-end which was only occasionally broken by distant aviators, I found myself turning the pages of a book on household management. It was obviously a book with a public, for it had run through six editions. I was assured that it contained a mass of useful guidance to the mistress of a house: but I was most impressed by the pithy expression and downright commonsense of notes in the first chapter on "Choice of a House." Here are three examples:

★

Neighbourhood. This is often influenced by the rent. If possible a house should be conveniently near to the railway station, trams or the occupants' place of business. The proximity of an overcrowded churchyard, or unwholesome trade premises, marshy land or stagnant water, should be avoided, also narrow dark streets facing north, houses closely hemmed in by trees or in a low, damp situation.

The slope on which a house is built is of the utmost importance, as even gravel if low lying may contain a large quantity of water. Damp soil necessarily renders a house colder, so that it is less economical (more fuel being required) as well as unhealthy, phthisis, ague, croup and dysentery being among the complaints aggravated if not actually caused.

The vegetation affords a little guide as to the character of the soil—grass is greenest on a damp soil; rhododendrons are larger and blossom more freely on a peaty, sandy soil; laurels, bays and laurustinus will not flourish in impure air; while stunted oak trees indicate a depressing atmosphere. Some plants cleanse and drain the soil, notably eucalyptus trees and sunflowers.

★

Size of the Rooms. Persons who habitually live in small rooms never enjoy vigorous health. They are usually listless, apathetic, and suffer from headache and loss of appetite. . . .

ARCHITECTURAL DISCOVERY

A young architect who faced a selection board for the R.A.F.V.R. last month was asked who was the last British Ambassador to Germany. His correct reply impressed the board very favourably: so much so that one of its members confessed that three previous candidates had given the name of H. V. Morton.

★

The link between Sir Neville and the author of *In Search of England* is, I am told, that a series of articles by the latter was succeeded on the same page of a great daily by the reminiscences of the former: and a less alert section of the newspaper's readers found it easier to confer ambassadorial rank on Mr. Morton than to face the thought that somebody else was now writing about something different.

★

It is fascinating to think of the added power which this psychological discovery confers on the press. Within a month, if it were fully used, a large minority of the public could be brought to the firm belief that Mr. Hannen Swaffer is Ambassador to the U.S.A.; that William Hickey is Minister of Home Security, and Lord Castlerosse President of the Royal Academy.

HICKEY TO THE RESCUE

William Hickey, by the way, recently drew attention in his column to the large number of area railings in the Bloomsbury district. These, he said, with the Napoleonic assurance of all irresponsibles, should be instantly removed for scrap, and replaced by a light fence.

★

He overlooks two facts. The scrap value of each house's railings is probably no more than a pound or two—Mr. Melvin will correct me—and someone must pay for removal, cartage, and the new fence. Most important of all in these days of timber and steel shortage, of what is this "new light fence" to be constructed?

CONSTRUCTIVE CLEAN UP

As was announced in the JOURNAL last week, architects have now an inducement to tackle the long postponed job of clearing out sample shelves, cupboards and indeed their whole offices.

★

Mrs. Lanchester has asked for cut-offs, plywood, old strainers, cores from drawing paper rolls, wood and hard-board samples, and all the odds and ends that litter the wartime office in an even more dusty condition than usual. They are needed for making toys for evacuee children, and should be sent to Mrs. Lanchester, at 19 Bedford Square, London, W.C.1.

ARCHITECTS' REGISTRATION

I offer my apologies for a misstatement in a note of mine published on July 11.

★

I then stated that anyone who has not Registered under the Architects' Registration Act by August 1 next will not be able to call himself an architect thereafter. This is incorrect. August 1 is the closing date for applications for Registration, and all architects should see that their applications for Registration have been sent to, and received by, the Registration Council before that date.

★

I may add that I erred in good company. The R.I.B.A. Journal for July 15 makes the same mistake.

ASTRAGAL

INDEX

The Index to the contents of THE ARCHITECTS' JOURNAL for the half-year, Volume No. 91, January to June, 1940, is now ready. Subscribers may obtain a copy upon application to:—

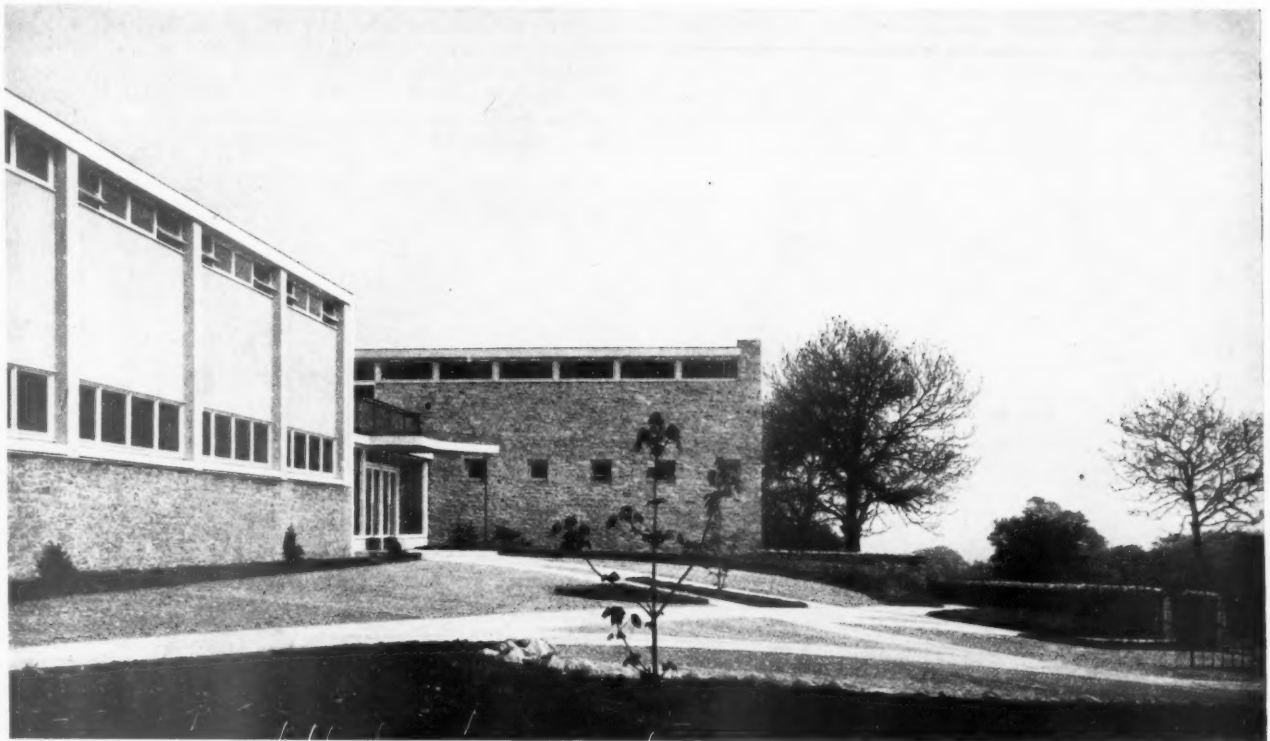
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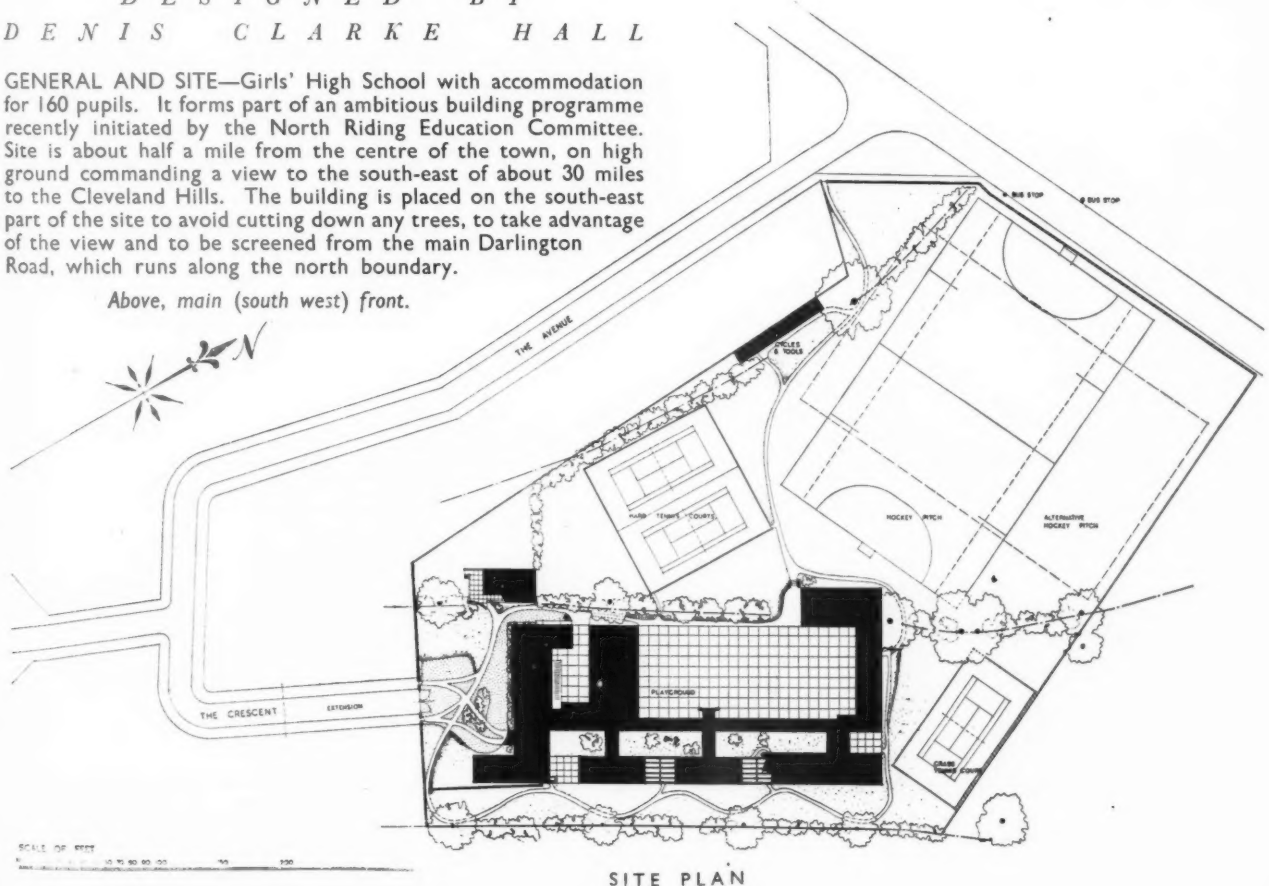


SCHOOL AT RICHMOND, YORKSHIRE

DESIGNED BY
DENIS CLARKE HALL

GENERAL AND SITE—Girls' High School with accommodation for 160 pupils. It forms part of an ambitious building programme recently initiated by the North Riding Education Committee. Site is about half a mile from the centre of the town, on high ground commanding a view to the south-east of about 30 miles to the Cleveland Hills. The building is placed on the south-east part of the site to avoid cutting down any trees, to take advantage of the view and to be screened from the main Darlington Road, which runs along the north boundary.

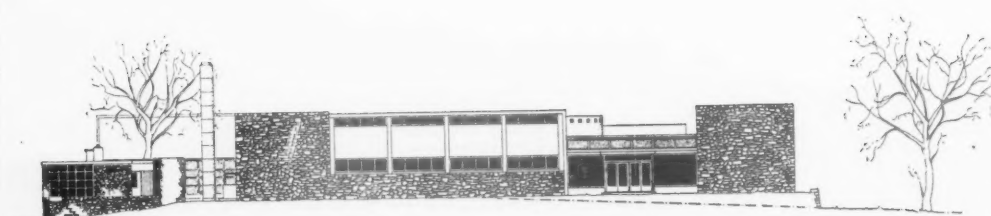
Above, main (south west) front.



SITE PLAN

PLAN—The architect of the building was one of the winners of the "News Chronicle" competition, held in 1937, and in its general principles the planning is the same as in the competition scheme, although it naturally had to be adjusted to the particular requirements and the site. The two principal governing factors were the need for even light and ventilation throughout and the importance of complete acoustic isolation

of all parts intended for mental work. These are achieved by isolating the classrooms in pairs as separate pavilions with open terraces between and connected with the central corridor of the building by short glazed corridors. The buildings are one storey in height with the exception of the two-storey administration block. The assembly hall has a floor area of 1,800 sq. ft., and is intended for use as a theatre and cinema and for school



SOUTH-WEST ELEVATION



The caretaker's cottage, a one-storey building, is situated near the western corner of the site, commanding the forecourt and main approach. Above is the south-east elevation, containing

a covered entrance porch in the centre. The curved stone wall on the left screens a wide paved terrace in front of the living-room windows.

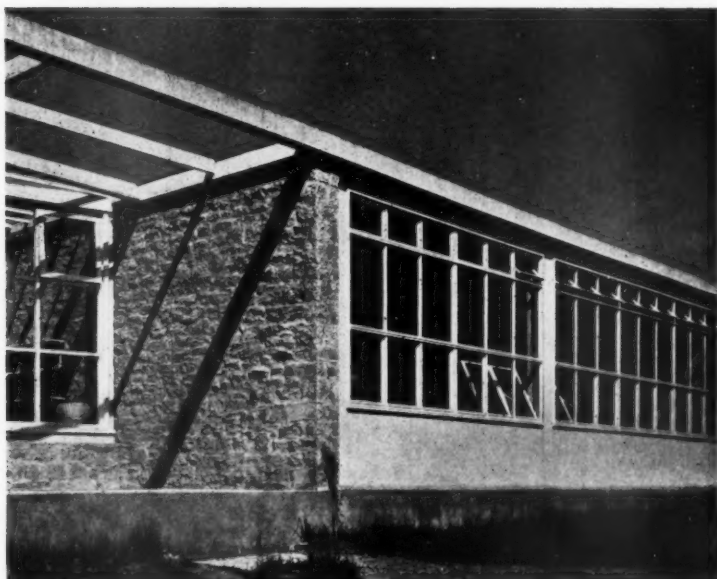
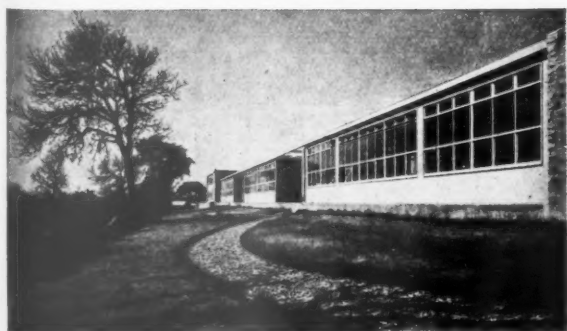
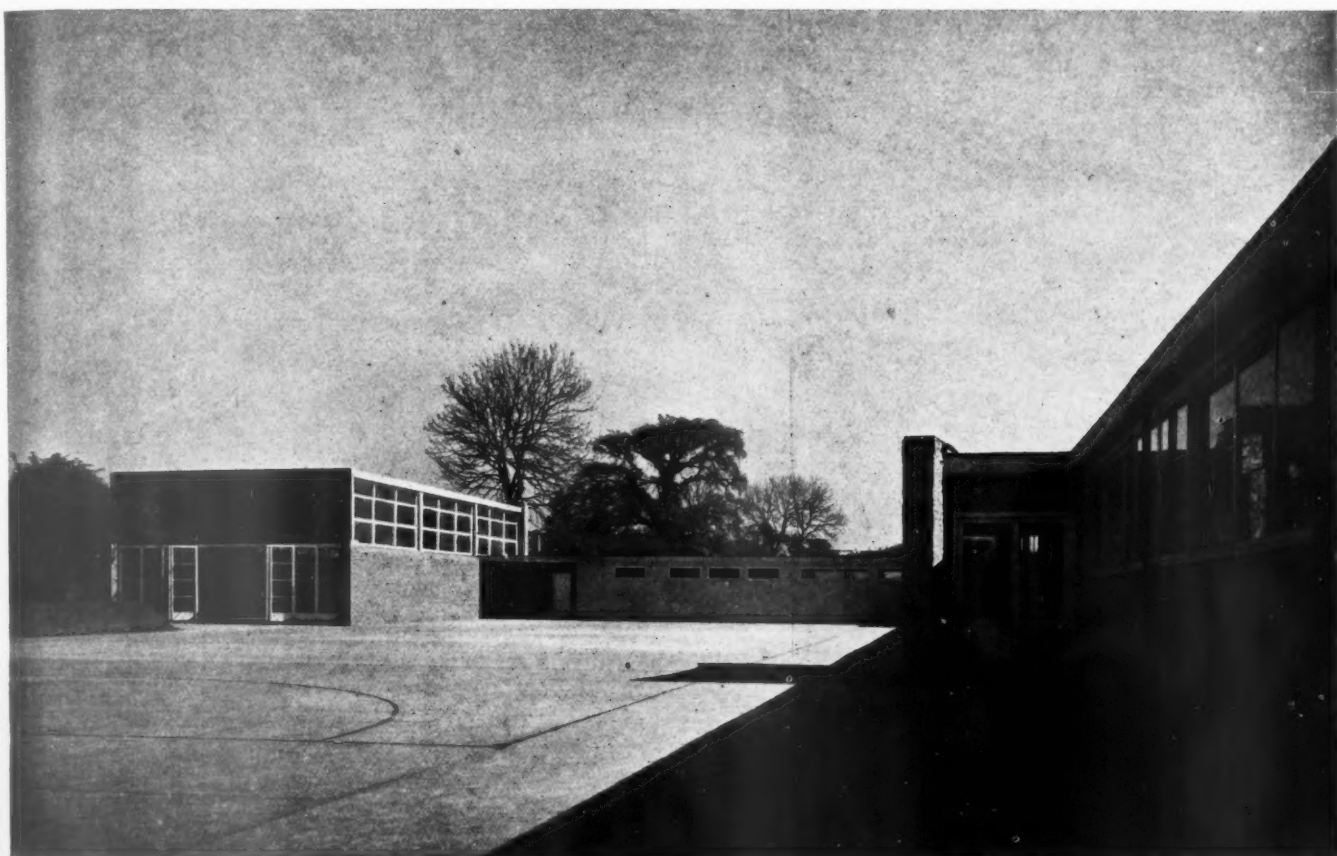
SCHOOL AT RICHMOND, YORKSHIRE

meals as well as for general school purposes. The hall and staff rooms, together with the entrance hall, can be completely isolated from the rest of the building for theatrical performances, etc. The wall between the entrance hall and the assembly hall is made to slide away so that the former can serve as an extension of the latter when extra seating accommodation is required. Access to the library and to a roof terrace is by the main staircase

and a short ramp from the first of the terraces that separate the pairs of classrooms.

CONSTRUCTION AND EXTERNAL FINISHES — Much use has been made of local stone. It is used in the form of solid rubble walls, for the portions of the buildings that did not demand openings larger than could be spanned by a stone lintol,

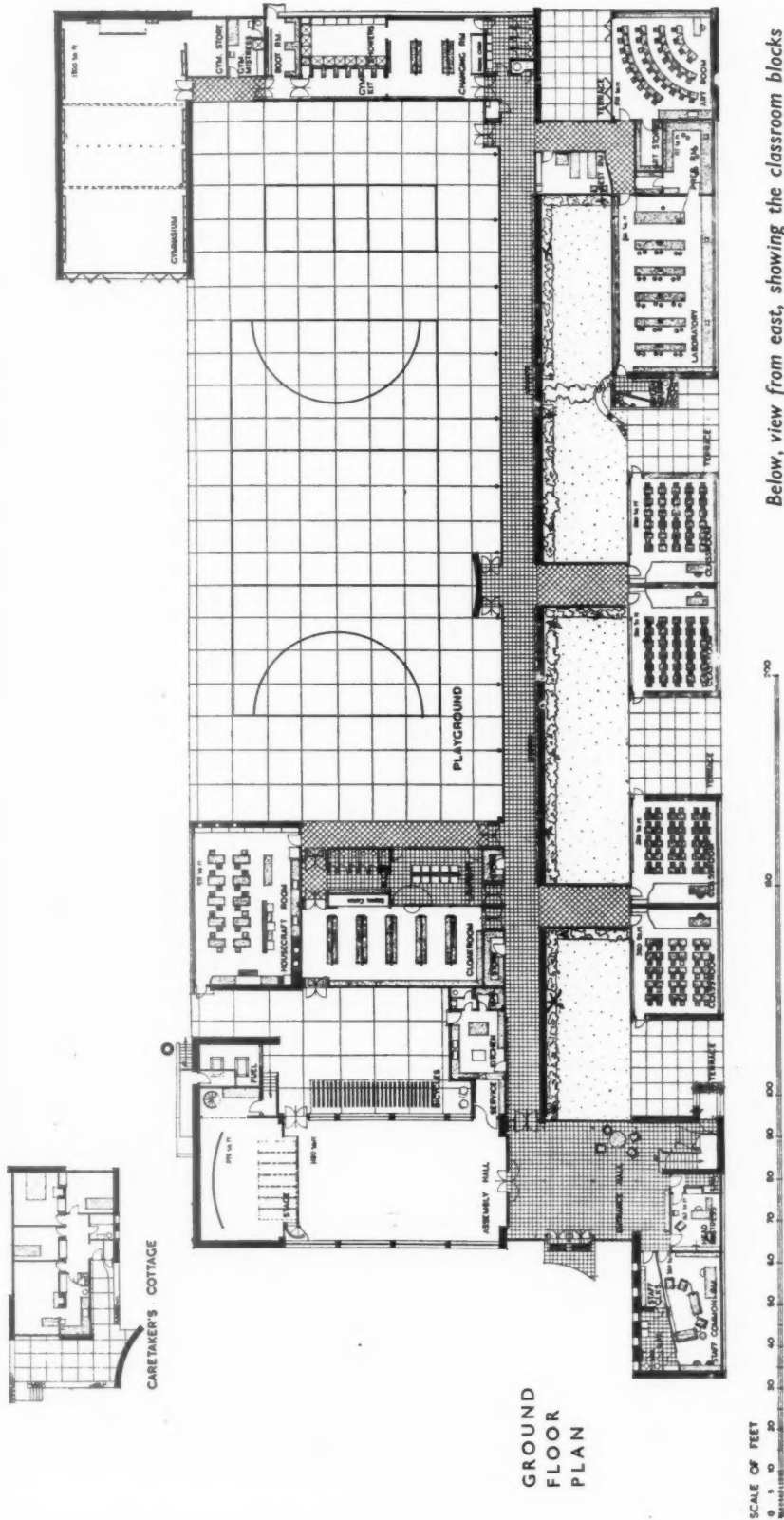
(Continued on page 76.)



Top, looking across the playground towards the gymnasium and changing rooms. The main corridor and one of its entrance vestibules is on the right. Left, a view looking along the south-east front of the

building showing the classrooms grouped into pairs and separated by open terraces, and a view from the roof of the assembly hall block. Right, detail of the classroom wing.

DESIGNED BY DENIS CLARKE HALL



Below, view from east, showing the classroom blocks and, extreme left, the two-storey administration block.

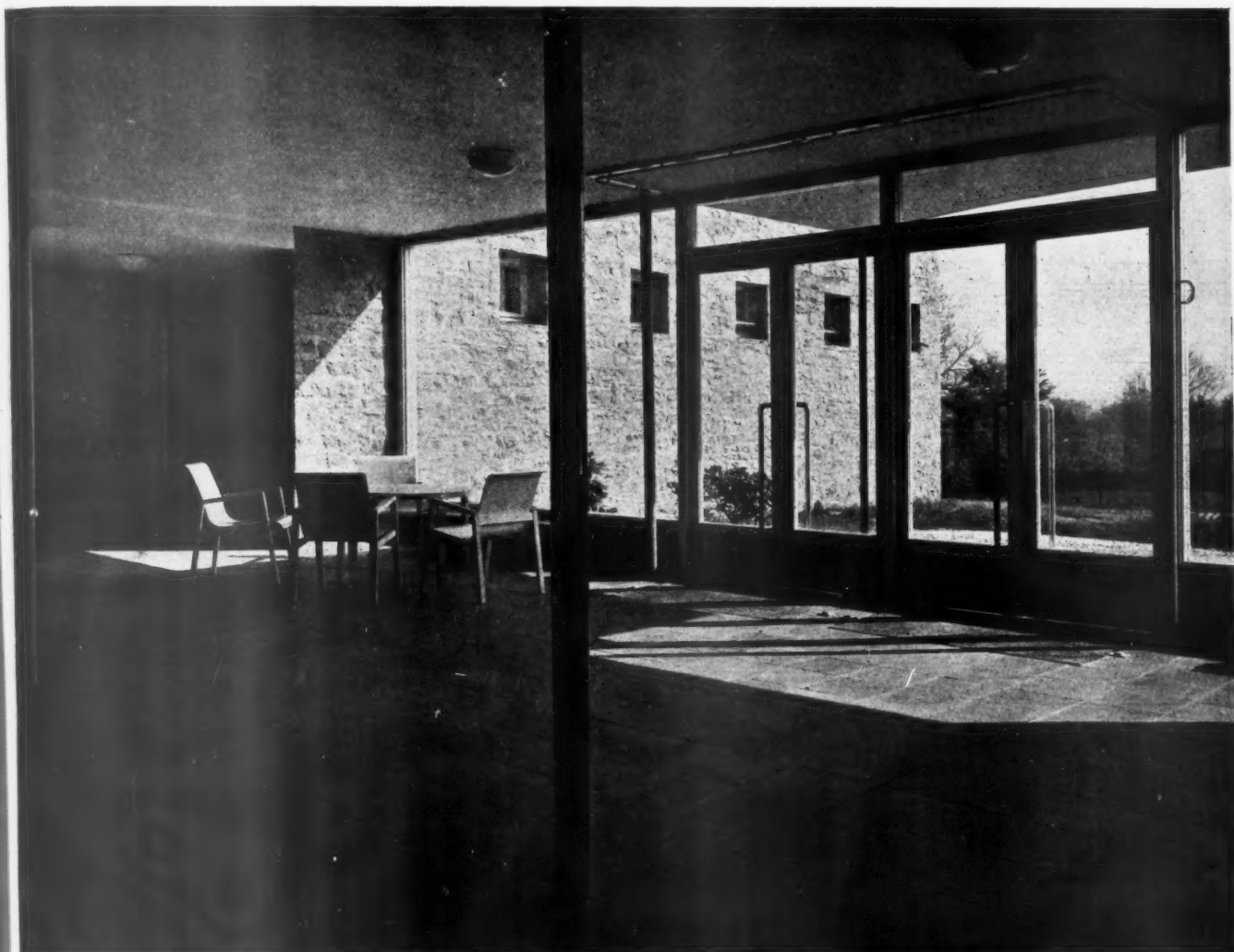


SCHOOL AT RICHMOND, YORKSHIRE • BY DENIS CLARKE HALL



Top, left, the assembly hall looking towards the stage; right, the library, the only room on the upper level; bottom, main entrance.

SCHOOL AT RICHMOND • BY DENIS C I



Above, the entrance hall; below, the main staircase leading to the terrace and library





The gymnasium

CONSTRUCTION AND EXTERNAL FINISHES—(continued)—

the walls with larger openings being of R.C. frame construction. Administration building: The random rubble stone external walls vary in thickness from 15 in. to 24 in. throughout the building, and have a 2-in. to 3-in. burnt clay block wall on the inside with a 2-in. cavity between to ensure absolute dryness and to give a smooth face for plaster. Internal partitions are of the same blocks. Stone walls are carried down to the ground, and where roofs and floors rest on them spreader beams are employed to distribute the load. Roof and floor slabs 4 in. or less in thickness are solid reinforced concrete. Those of greater thickness are hollow tile. The back wall of the staircase well is of the same rubble stonework as the outside. The internal wall, which actually carries the stairs, is of 13½-in. brickwork plastered, and a solid plaster panel is suspended in the bronze frame of the handrail. Assembly hall: R.C. frame carried down to spot foundations. R.C. walls, 4 in. thick, insulated with 1 in. of cork, span between the columns of the side walls; elsewhere the walls are rubble stonework. External concrete is painted in pale tones of grey, grey-pink and grey-blue. The concrete

canopy above the entrance doors is supported by a single steel column.

INTERNAL FINISHES AND EQUIPMENT—Entrance hall: Paved with square blue cement tiles; the steel column is painted dark red. Assembly hall: Ceiling and back wall up to the door head are painted gorse yellow, the columns and beams are pale grey-blue with soffits and holes brick red, and the side panels between the windows are pale pink. Dado is panelled in oak ply. The seating, designed by the architect, is movable in units of six. The seats hinge up so that the units can be stacked. Seats and backs are mahogany, set in an oak frame. Classrooms: Each room has a different colour scheme, but all the schemes are based on a limited range of colours used in varying proportions. Both desks and chairs can be stacked by nesting. The furniture is in mahogany and beech. Library furniture is in mahogany and oak birch.

The general contractors were George Dougill and Sons, Ltd.; for list of sub-contractors see page xvi.

LETTERS

A.R.P. and Evacuation

SIR,—It is high time that architects, even though they are not officially considered necessary in wartime, raised a voice of protest at the continued chaos of Government A.R.P. and evacuation policy. This policy was improvised at a time when the energies of Government Ministers were concentrated on efforts to appease the aggressors—efforts which were at the expense of political, military and civil defensive measures. After “Munich” came the “Golden Age” when Government confidence in Hitler’s signature was at its highest, and A.R.P. was something of a white elephant. It is quite understandable that a policy produced in this atmosphere could not be anything but half-hearted and ineffective.

With the reorganization of the Government, we might have expected a more vigorous and imaginative policy, but there have been very few signs of it—the only improvements that have been made have been chiefly the result of continued pressure by technical bodies such as the A.A.S.T.A. and the A.R.P. Co-ordinating Committee, and by people whose safety is at stake. It would seem as though the “appeasement” atmosphere still pervades the responsible Ministries. Consider, for example, the difficulties of obtaining steel and cement for shelters; if, as we are told by Government spokesmen, the civil population is now in the front line and inseparable from the armed forces, then there should be definite steel and cement quotas for their protection. Brick supplies are equally unsatisfactory, and the fact that many brick companies were forced to cease production in the earlier months of the war without any action being taken shows a complete lack of foresight in planning production of essential war materials.

The standards of protection and equipment of shelters have, if anything, been decreased. Baffle walls have been omitted from communal domestic shelters; brick is being increasingly used instead of reinforced concrete; shelters are still without lighting, seating, sanitary facilities, water, first-aid outfits, gas proofing or ventilation. The experience of recent air raids has revealed the impossible conditions under which people are expected to stay for lengthy periods in their shelters. Even more serious is the fact that almost half the people of the country are still without even a badly equipped shelter.

It was pointed out to the Government over two years ago that by building medium-size communal shelters it was possible by economy of construction to provide heavier protection and full equipment at the same cost per head

as for small unequipped and inferior dispersed shelters; that a communal shelter could be equipped with mechanical ventilation and gas filtration plant by reason of the increased accommodation based on 3½ sq. ft. instead of 6 sq. ft. per person, at no extra cost per head. And yet no change in policy has been made.

There is hardly need for me to say anything about the Government’s evacuation policy. There is such confusion now that parents in vulnerable areas have been asked by billeting officers to take in children evacuated from the same coastal areas to which their own children are still evacuated.

Now this is not mere fault-finding for its own sake—the safety of the civil population is at issue. It is the duty of technicians to criticize fully and frankly all inefficiencies with which their work makes them familiar, and to help put an end to this chaos. Apparently, in spite of Government changes, the same “appeasement” spirit still pervades the responsible Ministries. We must demand an immediately change and, if necessary, the removal of all those responsible for the complacent *laissez-faire* of the last few years.

W.6.

ARTHUR G. LING

Flat Roofs and Air Attacks

SIR,—There seems to me to be one snag to Mr. Marriott’s admirable suggestion for forming reservoirs on asphalt roofs to help in putting out fires caused by incendiary bombs.

It is probable that an incendiary bomb which had penetrated a roof would fall more or less vertically on to the floor below, so that the water from the roof would flow directly on to the incendiary bomb. As is well known, this would be most undesirable, as it would cause the bomb to flame up and throw burning fragments over a considerable area. I think it is highly doubtful if the general flooding of the floor would compensate for the greatly widened area of the fire.

WARDEN

Collection of Old Linen Drawings

SIR,—Here is a chance for architects, engineers, builders and others with drawing offices to make a novel but valuable contribution to war-time economy and at no cost to themselves.

The Women’s Volunteer Service Headquarters, Thrift Section, under the direction of Lady Gower, has discovered that old linen drawings and

tracings can be easily treated, and utilized for the making of all kinds of articles where the use of fine linen is required—surgeons’ caps, masks, pillow cases, aprons, and even children’s charming frocks and underwear.

The Building Centre has undertaken to organize a campaign to keep the W.V.S. supplied with material sufficient to keep busy their hundreds of members all over the country who are anxious to help in this great scheme of making things out of material which may otherwise be waste. What a wonderful opportunity for a general clean up of the cluttered drawing office! There must be thousands of reams of old linen drawings in rolls, on shelves, in chests and in cupboards under the stairs. In fact, in all those places where it is a habit to store drawings when a job is finished in the very uncertain hope that there might at some time or other in the future be a need to refer to them in connection with extensions or other jobs. It is for all these old drawings on linen, *not* paper, that we are now appealing.

Please send bundles addressed to me at The Building Centre, 158 New Bond Street, W.1 (marked “Old Linen” with name of sender), where a clearing depot has been arranged for the whole country. Let there be no suspicion that drawings will be utilized for any other purpose than that for which they are asked. They will certainly go to the boiling pot. If some of these old drawings are cherished as essential records, why not go to the small expense of making paper duplicates and send us the much-needed linen? If all the drawing offices in the country will heed this urgent appeal and devote a little time to see what they can do about it the results will be magnificent.

W.1.

F. R. YERBURY

DIRECTOR, BUILDING CENTRE

* B.S.I.

A supplement to B.S./A.R.P. 33 has just been issued by the British Standards Institution.

This supplement gives a complete set of drawings of a typical stirrup pump, which, if correctly made of suitable materials, should comply with the requirements of B.S./A.R.P. 33. All essential dimensions are given, and special attention has been paid to particular points where failure occurred in earlier models.

Copies of this B.S./A.R.P. No. 33 may be had from the British Standards Institution, 28 Victoria Street, London, S.W.1, price 8d. (post free).

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COLUMNS FORMED FROM TWO OR MORE CHANNELS TO WITHSTAND BENDING MOMENTS AS WELL AS DIRECT LOAD.

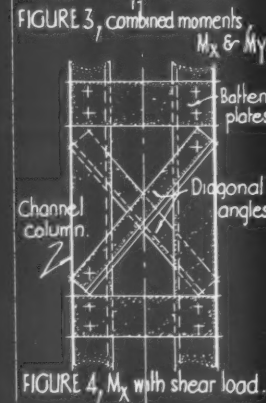
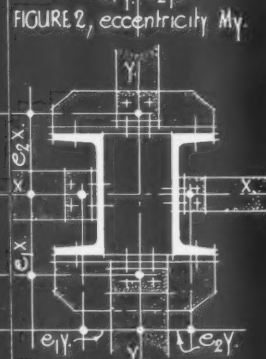
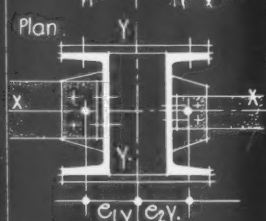
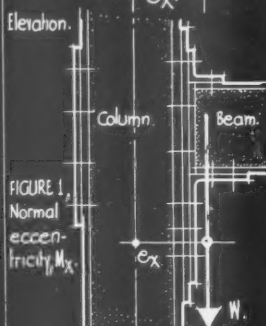
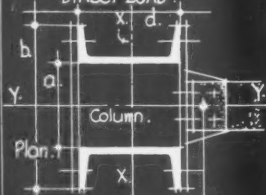


TABLE GIVING REDUCTION COEFFICIENTS (β) FOR TWO EQUAL B.S.S. CHANNEL SECTIONS SPACED BACK TO BACK, AS ECCENTRICALLY LOADED COLUMNS (STRUTS)

Approx. overall size of col. d x b ins.	Size of each channel ins.	Min. distance apart ins.	Weight of col. lb/ft.	ECCENTRICITY ex ins.	ECCENTRICITY ey ins.	LENGTH OF COLUMN OR STRUT IN FEET.											
						6	7	8	9	10	11	12	13	14	16	18	20
3 x 4 1/2	3 x 1 1/2	1-18	9-2	2-0	1-34	1-32	1-23	1-12	1-01	0-91	0-83	0-75	0-69	0-61	0-54	0-44	-
3 x 4 1/2	3 x 1 1/2	1-14	10-22	2-0	1-34	1-31	1-22	1-09	1-01	0-91	0-83	0-75	0-69	0-61	0-54	0-44	-
4 x 6	4 x 2	1-64	14-18	2-5	1-67	1-41	1-39	1-34	1-26	1-19	1-12	1-04	0-95	0-86	0-75	0-64	0-56
4 x 6	4 x 2	1-56	15-82	2-5	1-67	1-40	1-38	1-32	1-26	1-19	1-12	1-04	0-95	0-86	0-75	0-64	0-56
5 x 7 1/2	5 x 2 1/2	2-16	20-44	3-0	2-00	1-44	1-42	1-41	1-38	1-34	1-28	1-26	1-17	1-12	0-96	0-89	0-76
5 x 7 1/2	5 x 2 1/2	2-08	22-48	3-0	2-00	1-44	1-42	1-41	1-38	1-34	1-28	1-26	1-17	1-12	0-96	0-89	0-76
6 x 9	6 x 3	2-72	24-82	3-5	2-34	1-46	1-44	1-43	1-42	1-41	1-38	1-34	1-31	1-27	1-17	1-05	0-95
6 x 9	6 x 3	2-64	27-28	3-5	2-34	1-46	1-44	1-43	1-42	1-41	1-38	1-34	1-28	1-26	1-17	1-05	0-95
6 x 8 1/2	6 x 3	2-46	33-02	3-5	2-47	1-46	1-44	1-43	1-41	1-40	1-38	1-32	1-27	1-23	1-13	1-04	0-94
6 x 8 1/2	6 x 3	2-44	35-06	3-5	2-47	1-46	1-44	1-42	1-41	1-40	1-35	1-32	1-27	1-22	1-13	1-01	0-91
6 x 9 1/2	6 x 3 1/2	2-12	32-96	3-5	2-21	1-46	1-44	1-43	1-42	1-41	1-38	1-34	1-31	1-26	1-17	1-05	0-95
6 x 9 1/2	6 x 3 1/2	2-22	37-04	3-5	2-21	1-46	1-44	1-43	1-42	1-41	1-38	1-34	1-28	1-26	1-17	1-04	0-94
7 x 10	7 x 3	2-58	28-44	4-0	2-80	1-48	1-47	1-46	1-43	1-42	1-41	1-40	1-38	1-34	1-27	1-19	1-09
7 x 10	7 x 3	3-68	34-14	4-0	2-80	1-48	1-47	1-46	1-43	1-42	1-41	1-39	1-35	1-34	1-23	1-15	1-05
7 x 10 1/2	7 x 3 1/2	3-08	36-56	4-0	2-66	1-48	1-47	1-46	1-43	1-42	1-41	1-40	1-38	1-34	1-27	1-19	1-09
7 x 10	7 x 3 1/2	2-96	40-36	4-0	2-66	1-48	1-46	1-46	1-43	1-42	1-41	1-39	1-35	1-34	1-26	1-17	1-08
8 x 10 1/2	8 x 3	4-42	31-92	4-5	3-41	1-49	1-48	1-47	1-46	1-44	1-43	1-42	1-41	1-39	1-34	1-28	1-22
8 x 10 1/2	8 x 3	4-20	37-36	4-5	3-41	1-49	1-48	1-47	1-46	1-43	1-43	1-41	1-39	1-38	1-32	1-25	1-17
8 x 11	8 x 3 1/2	3-94	40-42	4-5	3-28	1-49	1-48	1-47	1-46	1-44	1-43	1-42	1-41	1-39	1-34	1-28	1-17
8 x 11	8 x 3 1/2	3-80	46-40	4-5	3-28	1-49	1-48	1-47	1-46	1-43	1-43	1-41	1-40	1-39	1-34	1-27	1-17
9 x 11 1/2	9 x 3	5-20	34-92	5-0	3-91	1-50	1-49	1-48	1-47	1-46	1-43	1-43	1-42	1-41	1-38	1-32	1-27
9 x 11 1/2	9 x 3	5-04	39-82	5-0	3-91	1-50	1-49	1-48	1-47	1-46	1-43	1-43	1-42	1-41	1-38	1-31	1-26
9 x 12	9 x 3 1/2	4-78	44-54	5-0	3-75	1-50	1-49	1-48	1-47	1-46	1-43	1-43	1-42	1-41	1-38	1-32	1-27
9 x 12	9 x 3 1/2	4-74	46-98	5-0	3-75	1-50	1-49	1-48	1-47	1-46	1-43	1-43	1-42	1-41	1-35	1-32	1-27
9 x 12	9 x 3 1/2	4-62	51-26	5-0	3-75	1-50	1-49	1-48	1-47	1-46	1-43	1-43	1-42	1-41	1-38	1-31	1-27
10 x 12	10 x 3	5-98	38-56	5-5	4-60	1-50	1-49	1-49	1-47	1-46	1-46	1-44	1-43	1-42	1-40	1-35	1-32
10 x 12	10 x 3	5-94	42-66	5-5	4-60	1-50	1-49	1-49	1-47	1-46	1-46	1-44	1-43	1-42	1-40	1-35	1-32
10 x 13	10 x 3 1/2	5-58	48-92	5-5	4-24	1-50	1-49	1-49	1-47	1-46	1-46	1-44	1-43	1-42	1-40	1-35	1-32
10 x 13 1/2	10 x 3 1/2	6-18	57-08	5-5	4-24	1-50	1-49	1-49	1-47	1-46	1-46	1-44	1-43	1-42	1-40	1-35	1-32
11 x 13 1/2	11 x 3 1/2	6-38	53-56	6-0	4-90	1-50	1-50	1-49	1-48	1-47	1-46	1-46	1-44	1-43	1-41	1-40	1-38
11 x 13 1/2	11 x 3 1/2	6-20	61-40	6-0	4-90	1-50	1-50	1-49	1-48	1-47	1-46	1-46	1-44	1-43	1-41	1-40	1-38
12 x 14 1/2	12 x 3 1/2	7-22	52-74	6-5	5-38	1-50	1-50	1-50	1-49	1-48	1-47	1-46	1-46	1-43	1-42	1-41	1-38
12 x 14	12 x 3 1/2	7-00	60-90	6-5	5-59	1-50	1-50	1-50	1-49	1-48	1-47	1-46	1-46	1-43	1-42	1-41	1-38
12 x 15	12 x 4	6-92	62-66	6-5	5-20	1-50	1-50	1-50	1-49	1-48	1-47	1-46	1-46	1-44	1-43	1-41	1-39
12 x 15	12 x 4	6-74	73-26	6-5	5-20	1-50	1-50	1-50	1-49	1-48	1-47	1-46	1-46	1-43	1-42	1-41	1-39
13 x 16	13 x 4	7-22	66-36	7-0	5-70	1-50	1-50	1-50	1-50	1-49	1-49	1-49	1-48	1-47	1-46	1-43	1-43
13 x 15 1/2	13 x 4	7-44	77-84	7-0	5-88	1-50	1-50	1-50	1-49	1-49	1-48	1-47	1-46	1-46	1-43	1-42	1-40
15 x 17 1/2	15 x 4	9-36	72-74	8-0	6-82	1-50	1-50	1-50	1-50	1-50	1-49	1-49	1-49	1-49	1-48	1-46	1-44
15 x 17	15 x 4	8-98	84-98	8-0	7-08	1-50	1-50	1-50	1-50	1-50	1-49	1-49	1-49	1-48	1-47	1-46	1-43
17 x 19	17 x 4	10-62	88-68	9-0	8-02	1-50	1-50	1-50	1-50	1-50	1-50	1-49	1-49	1-49	1-48	1-46	1-44
17 x 18 1/2	17 x 4	10-28	102-56	9-0	8-25	1-50	1-50	1-50	1-50	1-50	1-50	1-49	1-49	1-48	1-47	1-46	1-43

* The values given to the right of or above the zig-zag line may be applied to secondary compressive members; they should not be applied to main structural columns, or struts, for which the values lie to the left of the zig-zag line. The criterion is a slenderness ratio of 150.

Issued by Brithwaite & Co. Engineers, Ltd.
Compiled by C. Williams, Consulting Engineer.

INFORMATION SHEET: STEEL FRAME CONSTRUCTION: No 29.
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1

THE ARCHITECTS' JOURNAL
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INFORMATION SHEET

• 800 •

STRUCTURAL STEELWORK

Subject : Economical Column Sections to Withstand Bending Moments as well as Direct Load ; 3, Two or More Channels

General :

This series of Sheets on steel construction is not intended to cover the whole field of engineering design in steel, but to deal with those general principles governing economical design which affect or are affected by the general planning of the building. It also deals with a number of details of steel construction which have an important effect upon the design of the steelwork.

Both principles and details are considered in relation to the surrounding masonry or concrete construction, and are intended to serve in the preliminary design of a building so that a maximum economy may be obtained in the design of the steel framing.

This Sheet is the twenty-ninth of the series, and sets out in tabular form the reduction coefficients by which may be calculated the comparative economic efficiency of eccentrically loaded columns, composed of two or more channel sections.

Axes :

Bending moments caused by vertical loads in columns of two channels will occur about the x-axis (M_x) for columns loaded in accordance with Figure 1. They will occur about the y-axis (M_y) for columns loaded in accordance with Figure 2. In Figure 3 a case is shown in which both moments occur, M_x and M_y .

Efficiency Coefficients :

The eccentricity e_x shown in Figures 1 and 3 is called the "normal eccentricity" and is explained on Sheet No. 28 of this series. The efficiency coefficient is to be found under the assumption that a proportion α of the load acts with such eccentricity. The efficiency coefficient (c) is then :—

$$C = \frac{C_2}{1 + \alpha\beta}$$

where C_2 is the efficiency coefficient for a column of similar composition under direct load (given as e on Sheet No. 12 of this series), and β is given in the table on the front of this Sheet.

Actual Eccentricity :

It should be noted that e_y represents the eccentricity in y direction, which would have the same effect as e_x . Where eccentric loads occur the actual eccentricity is usually different, and in that case α is to be reduced in the proportion

$$\frac{\text{actual eccentricity,}}{e_y}$$

values for e_y being given in the table. (This has been explained by an example on Sheet No. 28 of this series.)

Combined Moments :

As explained for joist sections on Sheet No. 28, the case shown in Figure 3 can be dealt with by taking,

$$\alpha = \alpha_x + \alpha_y$$

where α_x = the proportion of load causing bending moments about the x-axis and α_y about the y-axis, where α_x and α_y each have been reduced in the proportion

$$\frac{\text{actual eccentricity}}{\text{eccentricity given in table on front of this Sheet.}}$$

Shear Loading :

The construction of columns consisting of two channels which have to take bending moments, is no different from that given on Sheet No. 12 if these bending moments are merely produced by eccentricity.

However, if such bending moments should entail shear forces in the direction of the x-axis, i.e. if they are caused by horizontal loads in this direction, causing bending moments about the y-axis, it is advisable to add diagonals between the batten plates, as shown in Figure 4.

Bending moments about the x-axis have no effect on the construction at all.

Caution :

Although the resistance of the two channels against the bending moments M_y is much greater than that of a single joist, the actual eccentricity due to the connection of beams is also much greater, and this type of column should not be chosen where large bending moments about the y-axis are to be expected.

Previous Sheets :

Previous Sheets of this series dealing with structural steelwork are Nos. 729, 733, 736, 737, 741, 745, 751, 755, 759, 763, 765, 769, 770, 772, 773, 774, 775, 776, 777, 780, 783, 785, 789, 790, 793, 796, 798 and 799.

Issued by : Braithwaite & Co., Engineers, Ltd.

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Westminster, London, S.W.1

Telephone : Victoria 8571

SOME QUESTIONS ANSWERED THIS WEEK:

- ★ *PROTECTION of glass against blast: a general answer to many questions* - - Q⁴²⁵
- ★ *THE position of town planners under the National Service Act: can you give a ruling?* - - Q⁴³¹
- ★ *WHO makes Sunralite, a material for the temporary infilling of window openings?* - Q⁴³²
- ★ *CLIENTS for whom we have constructed a shelter wish to adapt it for use as a rifle range. From which firms can we obtain the fittings used?* Q⁴³⁵

THE ARCHITECTS' JOURNAL INFORMATION CENTRE

THE Information Centre answers any question about architecture, building, or the professions and trades within the building industry. It does so free of charge, and its services are available to any member of the industry.

Questions may be sent in writing to THE ARCHITECTS' JOURNAL, 45 The Avenue, Cheam, Surrey, or telephoned direct to the Information Centre: Regent 6888.

Enquirers do not have to wait for an answer until their question is published in the JOURNAL. Answers are sent direct to enquirers by post or telephone as soon as they have been prepared.

The service is confidential; and in no case is the identity of an enquirer disclosed to a third party. Samples and descriptive literature sent to the Information Centre by manufacturers for the use of a particular enquirer are forwarded whenever the Director of the Centre considers them likely to be of use.

Finally, if an answer does not provide all the information needed, the Centre is always glad to amplify any point on which the enquirer wants fuller explanation.

Any questions about building or architecture may be sent to:

THE ARCHITECTS' JOURNAL
45 THE AVENUE, CHEAM, SURREY
Telephone: VIGILANT 0087

or ring the Architects' Journal Information Centre at

R E G E N T 6 8 8 8

Q⁴²⁵ A very large number of enquiries concerning THE PROTECTION OF GLASS AGAINST BLAST have been received by the Information Centre the last two months. The Centre will, of course, continue to answer individual enquiries, but it is considered that the following survey of the questions most commonly asked, and the information available may be of assistance to readers of the JOURNAL.

The majority of enquirers have asked for an opinion on the relative merits of two or more protective coatings. The Centre is unable to give such an opinion, and can only draw the attention of enquirers to three points.

(1) The Experimental Branch of the Building Research Station have tested a number of protective coatings and devices, and have issued reports to the manufacturers concerned: architects who contemplate using a coating or device will no doubt ask to see a copy of the relevant report.

(2) The success of a liquid coating depends primarily upon thickness of application, and users should be careful to see that a gallon of a proprietary liquid is not spread over 50 yards super. when the standard of protection claimed can only be obtained by using a gallon to every

25 yards. It should be noted, however, that protective liquids fall into two main types—rubber latex and liquefied plastics—and the danger of thin coatings is greater with the former. (3) The final success of liquid coatings depends on the coating retaining its elasticity and adhesion to the glass. A number of coatings are still being tested for these qualities by the B.R.S. and interim reports are issued to manufacturers.

Other enquiries concerning glass protection fall into three main groups: "unbreakable" glass; reinforcements for existing glass; and glass substitutes.

All glass will yield if the explosion is sufficiently close, but wired glass and toughened and laminated glasses have much greater resistance than ordinary types. Wired glass breaks but does not fly under blast action and still presents a moderately weathertight surface. Toughened and laminated glasses also resist blast well, but their cost is high.

Many proprietary methods of reinforcing glass are now available. One of these is a resin impregnated net fabric* which can be cut to size, wetted and will then adhere to the glass. Given continuance of firm adhesion this product should give reasonable protection against flying glass and a fair chance that cracked glass will continue weathertight.

A similar result could presumably be obtained by the use of an ordinary gum varnish and net curtaining. Ordinary gum varnish may become very brittle after application to glass, but its firm adhesion continues. The gum varnish should be spread over glass and sash bars and the curtaining embedded in it. A second coating of varnish should secure the adhesion of the netting. This treatment would not have the transparency of some proprietary methods, but varnishes of considerable transparency can be obtained at a higher price.

Other proprietary products employing the same principle are Sunralite† and Windolite‡, which may be used either as glass reinforcement or glass substitute. Both employ a fine wire mesh embedded in plastic, which may be nailed, stapled or pressed into position. Another group are the clear plastic sheetings, such as Bexoid or Cellophane.§ Thicknesses are 3/1000 of an inch and upwards and common sheet sizes are 55 by 24 in. The materials can be used in multi layers,

*RESIN-IMPREGNATED NET FABRICS:—Dufay-Chromex, Ltd., 14 Cockspur Street, London, S.W.1; Dobsons and M. Browne & Co., Ltd., Queens Road, Nottingham; G. and F. H. Parkes (Nottingham), Ltd., Beeston, Notts; Keystone Paint and Varnish Co., Ltd., 15 Adelaide Place, London, W.C.1.

†Sunralite Glass Substitute Co., 84 Chestnut Road, London, N.17.

‡Windolite, Ltd., Harlow, Essex.

§PLASTIC SHEETINGS:—B.X. Plastics, Ltd., Hale End, London, E.4; British Cellophane, Ltd., 17 Stratford Place, London, W.1.

and for openings larger than sheet size, sheets can be overlapped and sandwiched between two layers of wire netting, and fixed to the netting by wire ties.

Other substitutes for glass are oiled silk and varnished wire gauze, though supplies of both may be limited. References to proprietary materials are given in footnote.

Q426 ARCHITECT, WARWICKSHIRE.—We have under construction a Decontamination Centre and **FIRST AID POST FOR A LARGE INDUSTRIAL FIRM** employing about 1,000 men. Our clients inform us that they wish the First Aid Unit to be capable of dealing with the accidents which occur in the daily routine of the works, as well as during aid raids. The nature of the work carried on by our clients is heavy steel construction, and we are informed that the number of casualties—which are of both a minor and serious nature—is somewhat considerable. The size of the room we have constructed for the purpose of First Aid is 15 ft. 6 in. by 32 ft. 6 in., and we are asked by our clients to put forward a scheme for the necessary First Aid equipment. Would you be good enough to let us know what are the essentials in this respect?

Home Office Welfare Pamphlet No. 4, entitled "First Aid and Ambulance Rooms for Factories" (His Majesty's Stationery Office, York House, Kingsway, London, W.C.2. Price 1s. net) deals with the construction, equipment and organization of First Aid Rooms. From the very general description given of the nature of the factory, i.e., heavy steel construction, it might just be that the works are such as to need the provision under the Factory Act of an ambulance room and carriage. Certain specified heavy industries employing more than 500 people must have such equipment. Information on this point will be available in Factory Acts, particularly the Main Acts, as contained in General Order F.R. & O. (1917) No. 1067 and the subsequent amending Order F.R. & O. (1938) No. 486 or can be obtained from the Local Factory Inspector.

Q427 BUILDERS, LONDON.—In a Ministry Specification we are pricing at the moment **BITUMEN FELT REINFORCED WITH WIRE NETTING** is mentioned. Where is this obtained?

The material is available from Messrs. Langley London, Ltd., 161 Borough High Street, S.E.1, and this firm has supplied the following particulars: Sheet sizes are up to 36 in. wide and

lengths up to 20 ft. The weight of the material is 7 lbs. per yard super, and the price in London for 10-ton lots is approximately 3s. 6d. per yard super.

Q428 ARCHITECT, PORTSMOUTH.—Can you give me **PRE-WAR AND PRESENT RATES FOR ELECTRICIANS and Mates for both Portsmouth and London?**

From the National Register of Electrical Contractors the following rates of wages were obtained:—

London	Electricians per hour	Mates per hour
Pre-war ..	1 10 $\frac{1}{2}$	1 6 $\frac{1}{2}$
Oct. 1939 ..	1 10 $\frac{1}{2}$	1 6

Wartime additions over October, 1939, rates:—
per week

Nov. 1939	3 6	These increases are over the basic hour rate and apply if the men work more than 3 days per week.
Jan. 1940	5 10	
Apr. 1940	9 2	
July 1940	10 5	

Portsmouth	Electricians per hour	Mates
Pre-war ..	1 6 $\frac{1}{2}$	No fixed rate, usually 75 per cent. or less of electrician rate.
Oct. 1939 ..	1 6 $\frac{1}{2}$	

Wartime additions same as London.

Q429 ARCHITECTS, DUBLIN.—Could you inform me whether ordinary **TRAVELLING TRUNKS** tightly packed with books, drawings laid flat, etc., could be utilized **AS extra OVERHEAD PROTECTION** in an ordinary house if spread in the roof space on top of the ceiling joists, which, in the particular case under consideration, are amply strong enough to support them. While I am aware of the danger of heavy articles of this kind falling into the rooms below, and the possibility of such inflammable material as paper taking fire, it occurred to me that where storage space is to be found for articles of this kind they might, if packed really tightly, be helpful in resisting the penetration of shrapnel or bomb fragments. I may add that one of the ground floor rooms in the house in question is being strengthened, and the ceiling adequately supported in accordance with the British regulations, and this room should be proof against the collapse of the building under ordinary circumstances.

Little useful purpose would appear to be served by the action suggested. Shrapnel and bomb fragments and spent bullets will be stopped by the roof or top floor, and no extra protection will be obtained against H.E. bombs. On the other hand, incendiary bombs which lodge in the roof space will be much more difficult to handle, and the weight of

the debris which the ground floor strutting may have to resist will be measurably increased.

Q430 ENGINEER, LONDON.—*Who makes a NEW FORM OF WALLBOARD which has been described to me as a form of asbestos-cement and sawdust?*

This probably refers to the asbestos woodboard produced by the Turners Asbestos Cement Co., of Trafford Park, Manchester, and of Erith, Kent. This board is available in thicknesses of $\frac{3}{8}$ in. and $\frac{1}{2}$ in. and in a sheet size of 8 ft. by 4 ft.

Q431 TOWN PLANNING ASSISTANT, SOMERSET.—*I am employed as a Town Planning Assistant by a District Council which is preparing a Joint Planning Scheme under the 1932 Act for a number of authorities, and am due to register shortly, being 31 years of age. I was articled to a civil engineer, have passed the Preliminary Examination of the Institution of Civil Engineers and the Intermediate Examination of the Town Planning Institute, being unable to take the T.P.I. Final (for which I had entered this year) owing to calls of national service. I have been employed by local authorities since 1930 and continuously by them since 1935. The local Labour Exchange informs me that I am in a reserved occupation as a "Planning Clerk," whilst I am of the opinion that I am in the category of "Local Government servants, administrative and executive," since I am responsible to my authority for the preparation of the scheme. I think the term "Planning Clerk" refers to an occupation in the engineering trade, but as TOWN PLANNERS are not mentioned in the Schedule of RESERVED OCCUPATIONS, I should be glad of your opinion on this. In view of the apparent discrepancy in the Schedule between architects and civil engineers, a ruling on town planners, who frequently come from the ranks of architects or civil engineers, would probably be of interest to readers.*

In the Schedule of Reserved Occupations, revised May 1940 (His Majesty's Stationery Office, York House, Kingsway, W.C.2, price 1s.), there is no mention of town planners. In the Schedule, however, whole-time officers of Local Authorities are reserved at 30, where they are not specifically reserved at a lower age by reason of the occupation in which they are employed. The terms "Local Authority" and "Officer" are to be interpreted within the meaning of the Local Government Superannuation Act, 1937, and the Local Government Superannuation

(Scotland) Act, 1937, except that Local Authority does not include a Parish Council in England and Wales, or a District Council in Scotland. Until August 1, 1940, the age of reservation is 25. This ruling means that a local authority employee who holds a permanent appointment is reserved at 30 from date of appointment, and one who holds a temporary appointment is reserved at 30 if he has completed a total of two years' service with one or more local authorities.

Q432 LOCAL AUTHORITY, LONDON.—*Who makes SUNRALITE, a material for the temporary infilling of window openings?*

The Sunralite Glass Substitute Co., 84 Chestnut Road, London, N.17.

Q433 HOSPITAL AUTHORITIES, SUFFOLK.—*My Committee has decided to put down a new floor in a room which is to be used for the reception of casualties and for dressings. At present it is a concrete floor covered with linoleum, and it is proposed to use one of the PATENT NON-POROUS FLOORS used in rooms serving a similar purpose in other institutions. It has been suggested that we shall find it difficult to have this done at the present time owing to the lack of tradesmen with special knowledge. We should be interested to hear from firms able to undertake the work.*

In the circumstances we would suggest the use of quarry tiles, which could be laid over the concrete floor by ordinary building operatives. As an alternative, asphalt flooring either in black or colours could be used, but this would require specialist layers. Coloured asphalt floorings are available from: The Limmer and Trinidad Lake Asphalt Co., Ltd., Berry Hill House, Taplow, Bucks; or the Val de Travers Asphalte Paving Co. Ltd., 21 Old Bailey, E.C.4.

Q434 ARCHITECT, CARLISLE.—*Which firms make an economical type of TWO-MAN MANUAL PUMP of the type the Home Office recommend as intermediate between the stirrup and trailer pumps?*

These two-man manual fire pumps are available from Messrs. Sigmund Pumps (Great Britain), Ltd., Bush House, Aldwych, London, W.C.2, and from Messrs. A. J. Binns, Ltd., 53 Great Marlborough Street, London, W.1. Details of cost as given by the latter firm are as follows:

The pump itself costs £12 on aluminium stand with two delivery outlets. Additional cost for 60 ft. of 1 in. canvas unlined delivery hose complete with couplings and $\frac{3}{4}$ in. nozzle is £3 7s.; and 10 ft. of 1 $\frac{1}{2}$ in. bore armoured suction hose with strainer costs £3.

Q435 ARCHITECTS, LONDON.—*Clients of ours for whom we have constructed a shelter now wish to adapt the shelter for use as a RIFLE RANGE. From which firms can we obtain the fittings used?*

From information supplied by the Society of Miniature Rifle Clubs it would seem that all information desired and the fittings can be obtained from Messrs. George E. Greene and Company, 74 Falmouth Road, London, S.E.1; or Messrs. J. T. Spencer and Sons, Ltd., Albion Works, 25 London Road, Reading.

Q436 ARCHITECT, YORKSHIRE.—*I should be obliged if you could give me some advice as to the size and type of WATER STORAGE TANK I should install in the following case. The work is ON a FARM and the source of supply is by means of a spring which during the present dry spell does not provide sufficient water to meet the working requirements of the farm house alone. There is no bath or water closet at the present time, only a supply to the kitchen sink and to a water trough. During the winter and in normal times there is a good supply of water from this spring, but at the present time there is only a trickle. The average number of persons who will be living in the house will be six, and there is to be a bath and water closet. In the farm buildings there are to be two horses and twenty-five cattle each provided with water bowls, and there is to be a milk cooling and sterilizing plant installed. Owing to the rocky nature of the land, it is impracticable to construct the tank below the ground level.*

A useful work of reference on this subject is "Waterworks for Urban and Rural Districts," by H. F. Adams, published by Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2. In this publication the following figures are given: (1) Cottage property, rural area, a water allowance of 10 gallons per head per day is usual; (2) 15 gallons per head per day for horses and 8 gallons for cattle. On this basis there will be a daily requirement of 300 gallons. To this figure must be added an allowance for the use likely to be made of (1) the bath, (2) the

w.c., and (3) the milk cooling and sterilizing plant to be installed. Figures for these can be assessed after conversations with the employers. Then there will arise the number of days' water storage needed, and that again is something which can be done only in co-operation with the employers. The required tank size is thereafter easily assessed on the basis of 1 cubic foot for every $6\frac{1}{2}$ gallons. Normally, the construction of such a tank would be simple, using pressed steel sections and steel framing and bracing all as supplied and erected by firms such as Messrs. Braithwaite and Company (Engineers), Ltd., Horseferry House, Horseferry Road, S.W.1. But with the present-day restriction on the use of steel difficulties of supply might be experienced. Approaches should be made to the firm mentioned, and also to the Priority Officer of the Ministry of Agriculture and Fisheries, 10 Whitehall Place, S.W.1, to verify whether release of steel for this purpose is possible. The next possibility will be reinforced concrete, but again the supply of the reinforcing steel rods might be found im-

practicable. Failing that, then mass concrete or brickwork and rendering would seem the only alternative open and with unreinforced work careful design will be necessary in order to keep within safe tensional limits of these materials.

REFERENCE BACK

[This section deals with previous questions and answers.]

Q370. June 20, 1940.

Concrete tanks to contain fuel oil and petrol. It has been brought to our notice by the Adamite Co., Ltd., of Manfield House, Strand, London, W.C.2, that several fuel oil tanks in England have been constructed using "Colemanoid" No. 1 in the internal $\frac{3}{4}$ in. rendering and in the proportion of one part of Colemanoid to every six parts of the gauging water. Among the installations so constructed is that at Messrs. Harvey Nicholls' premises.

where it explodes, there being no spreading of the conflagration.

Aluminium paint is now used for a very wide range of purposes, for the protection of metallic surfaces from corrosion, to ensure cool storage interiors, as a result of high reflectivity, to improve resistance of metals to scaling at high temperatures, etc. In view of these applications, it is important that implications to the effect that aluminium paint constitutes a fire risk, and consequently should not be used in situations where inflammable gas is liable to be encountered, be carefully reviewed.

The conditions under which sparking from aluminium-painted surfaces occurs have been well established and can now be fairly clearly defined. Tests by an aluminium pigment manufacturer have been confirmed by the recent investigation undertaken by the Safety in Mines Research Board Laboratories, which shows that under certain conditions it is possible to produce sparks by striking an aluminium-painted ferrous surface.

When aluminium paint is applied to rusty surfaces of iron or steel and the paint film subjected to temperatures sufficient to break down the elastic structure of the binding medium, cracking and release of the film is liable to occur. If this surface is then struck with a steel or bronze implement, a spark or series of sparks may be produced. This has been responsible for the assumption that in the presence of inflammable vapour a fire risk is established. Careful consideration of the facts, however, reveals that a series of conditions must be present before such risk can be established. These conditions, all of which need to be present, are as follows:

(1) The paint is applied to a rust-coated surface.

(2) The paint medium is such as to permit cracking or has been broken down by heating to a temperature of not less than 90°C .

(3) Inflammable vapour in explosive concentrations must be present.

(4) The paint surface conforming to conditions (1) and (2) is struck with a metal or other hard-material implement.

It is highly improbable that the complete combination of these conditions would ever be met with in practice. From several points of view, therefore, the presence of aluminium paint cannot in itself be considered as constituting a true fire hazard.

Glass bricks have been used by the Islington B.C. for housing the traffic warning lights which are now required on surface

TRADE ITEMS

The existing stocks of wallpapers designed by William Morris, as well as the blocks used for printing them, have been acquired by Arthur Sanderson and Sons, Ltd., Berners Street, London, W.1. Many of the original Morris colourings have been continuously printed and are still current; also the colourings specially made for architects' and decorators' clients are still obtainable.

Certain of the Morris designs, particularly those which require a few colours only, are admirably suited to present-day needs. Among these the "Willow" and "Willow Bough" are the best known: they are excellent wall decoration and well deserve their popularity.

William Morris' productions were, as far as possible, made in his own workshops. Wallpaper printing was one of the exceptions; from the first they were printed by Jeffrey & Co.

Jeffrey & Co. continued to print the designs for Morris & Co. until A. Sanderson and Sons, Ltd., incorporated the Jeffrey business. Since that time the papers have been printed at the Perivale works, and now the whole of the interests in these papers have passed to Arthur Sanderson and Sons, Ltd.

Following an examination held in London last month, in which boys from public and secondary schools took part, F. M. Turner of Birkenhead School, D. A. MacWilliam of King's College School, and G. E. Mee of Chigwell School, have been awarded engineering scholarships worth £600 each by Messrs. R. A. Lister & Co., Ltd., of Dursley (Glos.).

The winners will be given a 4½-years' course of training in the machine shops and drawing offices in the Lister engineering works at Dursley.

During their training, instead of paying premiums as apprentices, they will be paid salaries which will start at £135 a year and rise to over £200.

The Linoleum and Floorcloth Manufacturers' Association recently conducted some experiments to demonstrate the fire-resisting properties of linoleum as a defensive measure against incendiary bombs. The results of these experiments are given in an illustrated booklet just issued by the Association. The illustrations show clearly how, when a linoleum covering is used, the effect of an incendiary bomb is confined to the spot



The external traffic warning illumination unit of this shelter erected in Islington consists of an Insulight glass brick (P.B.2 corner type) fixed in a recess at each corner of the shelter with the lighting element housed inside the shelter. The brick is $5\frac{3}{4}$ in. high and, the face being radiused, (quarter-circle), the warning light is visible from a wide angle. The general view on the left shows the white markings and space for corner light. See note on this page.



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M-W.69

air raid shelters when erected wholly or partly on the carriageway of a public highway.

The glass bricks, which are of the corner type (Insulight Glass Brick, P.B.2), are fixed in recesses at each corner of the shelter with the lighting unit inside the shelter. The radiused brick is $5\frac{1}{2}$ in. high, and the quarter-circle face gives a light which is visible from a wide angle.

Additional lights are required in the side wall of shelters which are over 50 feet in length, and for this purpose a glass brick with flat face can be used.

A light which is recessed, protected from damage, theft or interference, and not needing the attention of the hurricane lamps which were commonly used in the black-out last winter, has obvious advantages. Glass bricks are considered to be particularly suitable for housing shelter lights as they are highly resistant to blast and the method of fixing ensures a gas-proof joint.

Details are available from Pilkington Brothers, Ltd.

THE BUILDINGS ILLUSTRATED

NEW HIGH SCHOOL FOR GIRLS, RICHMOND, YORKSHIRE (pages 69-76). Architect: Denis Clarke Hall. General contractors were George Dougill and Sons, Ltd. Sub-contractors and suppliers included: Northern Asphalt and Roofing Works, Ltd., roofing covering; Joseph Kaye and Sons, Ltd., Henry Hope and Sons, Ltd., Dryad Metal Works, Ltd., door and window furniture; Ideal Boilers and Radiators, Ltd., lavatory basins, radiators; Baldwins (Birmingham), Ltd., w.c. and sinks, taps; Alpine Window Co., window control gear, wood windows; Graham Bros., Ltd., electrical installation; Matthew Hall & Co., Ltd., heating and ventilating; Bratt Colbran & Co., Ltd., electric fires; Hewitt Engineering Co., Ltd., boilers; Lenscrete, Ltd., glass concrete construction; Haywards, Ltd., patent roof glazing; Gypsum Mines, Ltd., Sirapite special plaster; May Acoustics, Ltd., acoustic plaster; Sissons Bros. & Co., Ltd., concrete paint; Wm. Harland and Son, paint; Walpamur, Ltd., distemper; George Churchill, North of England School Furnishing Co., Finmar, Ltd., furniture; Gordon Russell, Ltd., curtains; John Lewis & Co., Ltd., curtains and carpets; Tidmarsh and Sons, window blinds; Triplex Foundry, cooking—solid fuel; Samuel Parkes & Co., Ltd., school equipment.

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